

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A rubbed substrate structure for use in a liquid crystal assay device, comprising:

(a) a biochemical blocking compound chemically immobilized on a support thereby forming a biochemical blocking layer; and

(b) a biomolecule recognition agent deposited on the same side of the support as the biochemical blocking layer,

~~wherein the biochemical blocking layer comprises biochemicals,~~

wherein the biochemical blocking compound is selected from the group consisting of a protein, a zwitterionic polymer, an adsorbed lipid layer, a sugar, a cross-linked lipid, a polyethyleneoxide, a polyoxazoline, and a hydrogel,

wherein a surface of the biochemical blocking layer is a rubbed surface that possesses features that drive a uniform alignment of liquid crystals when the liquid crystals contact the rubbed surface,

wherein the biochemical blocking layer resists non-specific adsorption of non-target species, and

further wherein the biomolecule recognition agent comprises a recognition site capable of selectively recognizing a target species.

2. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biomolecule recognition agent is deposited on the rubbed surface.

3. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biomolecule recognition agent is deposited on the same side of the support as the biochemical blocking layer before the biochemical blocking layer is rubbed.

4. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biochemical blocking compound is immobilized on the support by crosslinking with a crosslinking agent.

5. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 4, wherein the crosslinking agent is glutaraldehyde.

6. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biochemical blocking compound is immobilized on the support by being bonded to a bifunctional spacer compound, wherein the bifunctional spacer compound is bonded to a surface modifying compound and the surface modifying compound is bonded to a functionality on the surface of the support.

7. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biomolecule recognition agent is immobilized on the support by being bonded to a bifunctional spacer compound, wherein the bifunctional spacer compound is bonded to a surface modifying compound and the surface modifying compound is bonded to a functionality on the surface of the support.

8. (Currently Amended) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biochemical blocking compound is the protein and the protein is ~~comprises~~ a serum albumin and the biomolecule recognition agent is an immunoglobulin, a portion of an immunoglobulin capable of recognizing and binding epitopes and binding domains associated with microscopic pathogens; a peptide; a polypeptide; a carbohydrate; a fragment of RNA; or a fragment of DNA.

9. (Currently Amended) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biochemical blocking compound is the protein and the protein is ~~comprises~~ bovine serum albumin and the biomolecule recognition agent is capable of recognizing and binding peptides, polypeptides, DNA, RNA, DNA fragments, RNA fragments or a binding domain associated with a protein, a virus, a bacteria, or a microscopic pathogen.

10. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein at least two regions of the rubbed surface are rubbed under different pressures, speeds, or for different lengths whereby the at least two regions of the rubbed surface have different sensitivities towards the target species.

11-13. Canceled.

14. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the support comprises glass.

15. (Original) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the support comprises silica.

16. (Previously presented) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the biomolecule recognition agent comprises a portion of an immunoglobulin capable of recognizing and binding epitopes and binding domains associated with microscopic pathogens; a peptide; a protein; a carbohydrate; a fragment of RNA; or a fragment of DNA.

17. (Previously Presented) A kit for use in a liquid crystal assay, comprising:

- (a) at least one rubbed substrate structure according to claim 1;
- (b) a second surface that uniformly aligns liquid crystals;
- (c) a spacing material adapted to be placed between the rubbed substrate structure and the second surface that uniformly aligns liquid crystals; and
- (d) a liquid crystal compound.

18. (Original) The kit for use in a liquid crystal assay according to claim 17, wherein the liquid crystal is 4-cyano-4'-pentylbiphenyl.

19. (Previously Presented) The kit for use in a liquid crystal assay according to claim 17, wherein the at least one rubbed substrate structure, the second surface that uniformly aligns liquid crystals, and the spacing material are preassembled into an optical cell.

20. (Original) A kit for use in detecting the presence of a target species in a sample, the kit comprising: at least one rubbed substrate structure according to claim 1 and a liquid crystal compound.

21. (NEW) The rubbed substrate structure for use in a liquid crystal assay device according to claim 1, wherein the protein is a serum albumin.

22. (NEW) The rubbed substrate structure for use in a liquid crystal assay device according to claim 21, wherein the serum albumin is selected from the group consisting of human serum albumin, rodent serum albumin, canine serum albumin, feline serum albumin, porcine serum albumin, equine serum albumin, and rabbit serum albumin.

23. (NEW) The rubbed substrate structure for use in a liquid crystal assay device according to claim 22, wherein the serum albumin is bovine serum albumin.